

STUDIES ON MARINE BRYOZOA. X. HIPPADENELLA  
CARSONAE, N. SP.

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The purpose of this paper is to give a detailed description of the morphological features of *Hippadenella carsonae*, new species and to note other species which are ecologically associated with it.

*Hippadenella carsonae* is a lepralioid Ectoproct, Order Cheilostomata, Suborder Ascophora, of the Family Hippoporinidae of Bassler (1953). It is named in memory of Louisa Carson, a beloved teacher of my early school years.

SPECIES DATA

*Hippadenella carsonae*, n. sp.

*Diagnosis:* Colony calcareous, twig-like; branching open. Twigs slender, cylindrical, with usually nine to twelve, sometimes more, wedge-shaped zooecia in cross-section. Mural rims raised, crinkled. The smooth to tubercled frontal is a pleurocyst with three to five pairs of oblique, tubular pores. Orifice lepralioid, rounded. Lyrula absent but two slight cardelles are placed low. Operculum with lateral parenthesis-like sclerites. Very broadly oval median suboral avicularium placed at a varying angle to the frontal plane and mounted on a wide porous avicularial chamber that contains prominent avicularial glands, muscles and vestigial polypide. Hyperstomial ovicell very salient, globose, but slightly flattened, tubercled and non-porous. Its arched rim is a continuation of the zooecial mural rims. Two communication areas (a multiporous pore chamber and corresponding opening) in lateral wall. Distal wall a sieve plate of numerous pores.

*Measurements:* The first figures are the minimum, the next the maximum and the last (in parentheses) the average of ten readings (or occasionally more) for each structure. Readings are in millimeters. L is for length, W for width, D for diameter, H for height.

1.073-1.406 (1.247)	L	Zooecia
0.407-0.555 (0.444)	W	Zooecia
0.115-0.173 (0.146)	L	Avicularial apertures (rostral and back areas)

0.101–0.173	(0.137)	W	Avicularial aperture
0.058–0.086	(0.072)	L	Mandible
0.094–0.173	(0.124)	W	Mandible
0.144–0.202	(0.173)	L	Zooecial orifice
0.144–0.216	(0.179)	W	Zooecial orifice
0.158–0.187	(0.170)	L	Operculum
0.173–0.202	(0.192)	W	Operculum
0.432–0.475	(0.452)	L	Ovicell
0.389–0.490	(0.422)	W	Ovicell
0.675–0.705	(0.690)	L	Tentacles (two readings only)

The zooecial polypide measurements below are based on only one reading each:

0.147	D	Tentacular bundle within the tentacular sheath
0.264	L	Esophagus
0.132	D	Esophagus, just below the tentacles
0.073	D	Esophagus, just above the cardia
0.029	H	Esophageal epithelial cells near tentacles
0.014	H	Esophageal epithelial cells near cardia
0.132	D	Stomach caecum (empty)
0.250	L	Rectum (empty)
0.088	D	Rectum (empty)

*Zoarium:* The zoarium or colony consists of openly branching twigs which sometimes fuse or anastomose with other twigs at point of contact. The twigs are fragile and brittle, breaking into shorter twigs, so that no true picture of the extent of a colony, nor the ultimate pattern of branching, whether dichotomous or irregular (Figs. 11, 13) can be gotten from the mass of short fragments at hand. Some of the broken fragments were up to 51 mm. long and about 2 or 3 mm. in diameter. There was about a pint of material in the collection, but not one of the stalks was a complete, intact colony.

To the naked eye the twigs appear smoothly cylindrical (Figs. 13, 21) except in the ovicelligerous region where they are covered with bumps (ovicells) as in Figure 11. The usual number of zoids around a branch is about nine to twelve, although occasional stalks may have almost twice that number just before a bifurcation (Figs. 14, 21). Zoids face outward around the usually cylindrical branches radially.

Dead twigs are white, living twigs yellow. In practically all the living twigs, *i.e.*, twigs collected when they were in the living state, the polypides were confined to the tips or distal part of the stalk while the basal, proximal part of the twig was dead, polypideless. The yellow color of live twigs is due to the presence of yellow polypides within the zooecia.

*Zooecia:* The outside calcareous skeletal case in which the soft zoid parts (digestive tract, musculature, tentacles) are housed is the zooecium. Zooecia are wedge-shaped in cross section (Fig. 21), mostly rectangular in frontal or face view and quincuncially arranged (Figs. 6, 12) like bricks in a wall. In side view the end wall (Figs. 8, 10) slants a bit obliquely downward and backward. In some zooecia

it is nearly horizontal. The frontal wall is of variable thickness, sometimes being twice as thick as the side wall.

Zooecial boundaries are well defined by mural rims (Figs. 3, 12, 17, 18, 23). The height of these partitions varies with age and with exposure to molar forces. Sometimes these rims are high and very crinkled. Other times they are nearly level with the zooecial front. In early secondary calcification the distal mural rims send slender calcified trabeculae across the operculum (Figs. 18, 23). Later, the orifice may be incompletely obliterated by more extensive calcification over the operculum (Figs. 6, 17).

The frontal wall is flat to convex, porcellanous to sparsely tubercled, non-porous centrally but completely perforated by about three to five pairs, usually three pairs (Fig. 10), of obliquely directed marginal tubular pores or tubes whose diameter varies (Figs. 30, 32). These tubes end in slight elliptical craters above the frontal (Fig. 32). Viewed from the front, the top pair of tubes slants diagonally, converging downward toward the zooecial mid front. The middle pair slants toward the zooecial mid line. The bottom pair slants diagonally upward toward the zooecial mid front, as in Figure 30. In other words, the marginal tubes lean toward the zooecial center front.

The front may be perfectly smooth except for the raised pores or it may be roughened by a few tubercles (Figs. 6, 17).

The side walls are straight and have two widely spaced, multiporous, blister-like interzooecial communication areas. These areas are variously known in bryozoan literature as rosette plates, septula, pore chambers, corresponding openings. The distal one is a pore chamber and the proximal one is a corresponding opening (Figs. 8, 10, 19, 26). The pore chambers have six to twelve small pores (Fig. 19). The corresponding opening has a single large hole rimmed about by an irregular annulus (Fig. 26). The quincuncial arrangement of zooecia brings the pore chambers of one vertical row of zooecia against the corresponding openings of the left or right vertical rows of neighboring zooecia, and vice versa. Silén (1944) has given an excellent and extensive account of pore chambers, corresponding openings, pore plates and various types of interzooecial communications for various species. Conditions in *Hippadenella carsonae* are in agreement with his findings for related species.

The end wall is oval to pear-shaped (Figs. 10, 21). Its smaller, medial part is punctured by numerous (about forty, more or less) small, closely spaced pores and slants downward more than the broader peripheral non-porous part. Sometimes the slant is rather steep, sometimes deviating little from the horizontal.

The calcareous frontal walls are a bit too opaque usually for satisfactory study of soft internal parts as tentacles, gut, gonads, musculature and avicularial apparatus. Decalcification was not attempted because of the nature of the colony—a number of zooecia radially arranged, very close together. Crushing the stalk gently in a drop of Euparal on a slide usually gave well dispersed material quickly and in reasonably satisfactory condition for microscopic study. Attempts were made to clear the youngest, slenderest, polypide-containing tips in glycerine and others in dioxan. Some clearing was accomplished with the glycerine but none with the dioxan. So, the description of the soft internal parts is based on crushed, dispersed material and also on what could be seen through the walls of the younger, less calcified zooecia.

For a study of the exoskeleton or zooecial walls calcining (burning off the chitinous and membranous coverings with a small blow pipe) is the most satisfactory method of preparation. However, calcining must be halted before the specimen becomes too fragile and disintegrates to powder.

*Autozooecial polypide:* The autozooecial polypide consists of the tentacles, gut and associated musculature (Figs. 2, 7, 16, 29). All polypides are in a retracted position, the polypides withdrawn into the body cavity, none with tentacles extruded through the orifice, so characteristics of the retractor muscles, parietal body wall muscles and tentacle number could not be studied. As far as can be deduced from retracted specimens there seem to be about twelve to fourteen tentacles. The tentacles are ciliated, rather stout and not of excessive length. They are withdrawn into a transparent membranous tentacle sheath which is closed at the top near the operculum (Fig. 16) by a sphincter or diaphragm. Two flask-shaped "oral" or "sub-oral" glands of unknown function are part of the sheath, just beneath the diaphragm. Attached to the diaphragm are two bundles of muscle fibers, the parieto-diaphragmatics, one on each side (Figs. 2, 16, 29). Their muscle fibers extend diagonally back and upward to attach to the zooecial wall. A short distance below the parieto-diaphragmatics are two membranous bands, the parieto-vaginals, which contain a few delicate fibers that are deviated from the tentacle sheath. The parieto-vaginals connect the tentacular sheath to the lateral zooecial walls.

The gut consists of mouth, esophagus, stomach (which has three divisions: cardiac, caecal and pyloric), rectum and anus. In some bryozoa there is a ciliated pharynx between mouth and esophagus but not in *H. carsonae*. The esophagus of *H. carsonae* is short and tapers slightly. Its epithelial mucosa cells are tall columnar, hyaline and not ciliated. Those near the mouth are twice as tall as those near the cardia, the diminution in height being gradual. A sphincter separates the esophagus from the cardia. Retractor muscles attach the lophophore (region at the base of the tentacles and around the mouth) to the body wall, so there originates a curtain of muscle fibers just at the beginning of the esophagus. The epithelial cells of the cardia are low, cuboidal, non-ciliated and not much different in diameter

#### LIST OF ABBREVIATIONS USED ON THE PLATES

A	Abductor mandibuli muscle fibers	N	"Oral" gland
B	Adductor mandibuli muscles	O	Orifice or aperture
C	Avicularial back area	P	Ovicell
D	Avicularial chamber	Q	Parieto-diaphragmatic muscle
E	Avicularial gland	R	Parieto-vaginal band
F	Avicularial polypide	S	Pore chamber or rosette plate
G	Avicularial rostral area	T	Pylorus
H	Avicularium	U	Rectum
I	Cardelle	V	Sclerite
J	Cardia	W	Stomach
K	Esophagus	X	Tentacles
L	Mandible	Y	Tentacular sheath
M	Mural rim		

All figures, except Figures 4, 8, 10, 11 and 13, were drawn with the aid of a camera lucida, and are of *Hippadenella carsonae*, new species, from Antarctic type locality, Sta. 104. Figure 11 is from the holotype, the others from paratypes. Measurements for structures are given in text.

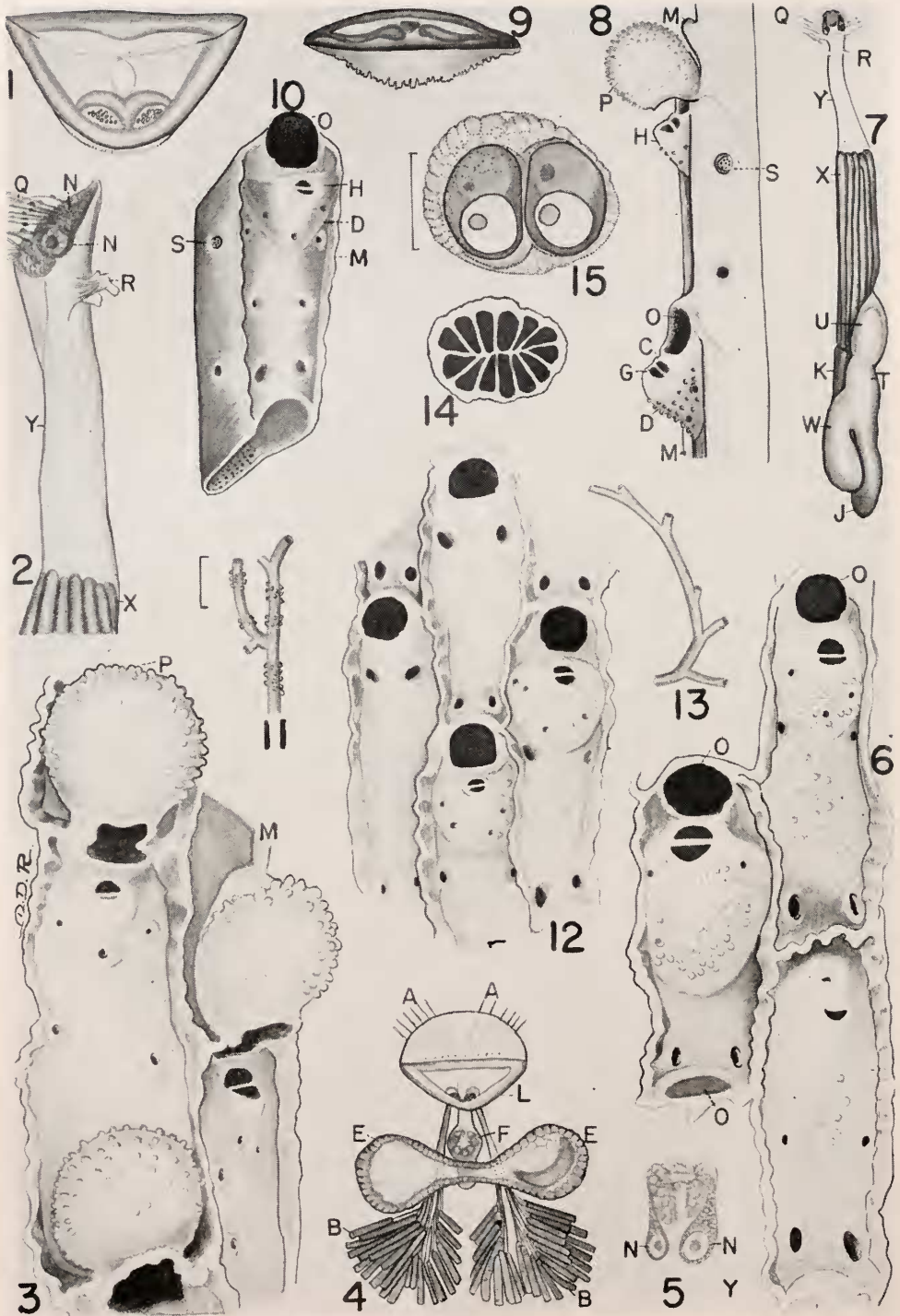


PLATE I

from those of the esophagus but their cytoplasm is granular rather than hyaline. The cardiac wall is thin. The cardia is J-shaped, parallelling the esophagus. The stomach caecum originates at the upper side of the cardia, near the pylorus, and has a highly granular cytoplasm. The pylorus is ciliated, internally. The different parts of the stomach and also the rectum are all rather thin-walled. Diatoms must be a part of the *H. carsonae* diet because diatom shells are in some of the recta.

The gut and tentacles amply fill the body cavity.

The ovary is attached to the side wall, behind the tentacular sheath and below the operculum. It is present in non-ovicelled zooids and presumably also in ovicelled ones as well as in zooids with or without an avicularium. If an avicularium is

#### EXPLANATION OF PLATE I

FIGURE 1. Mandible, top surface view. Transparent oval in center is the lucida. Adductor muscle fibers attach as individual dots in the two semicircular areas in front of lucida. Transparent rimming membrane (*cf.* Figs. 9, 25) here barely visible about rounded tip.

FIGURE 2. Side view of upper third of polypide. Compare with Figures 7, 16, 29.

FIGURE 3. Frontal view of three calcareous ovicelled zoecia. The upper two have avicularia whose chambers are small. From calcined specimen.

FIGURE 4. Diagram showing contents of avicularial chamber, as seen from top and front. One of the avicularial glands contains a hardened or coagulated crescent-shaped secretion. The delicate abductor muscle fibers are shown bent upward, out of their natural position, for the sake of clarity. They should extend downward and backward toward the base of the avicularial chamber, some distance away from and back of the adductor tendons.

FIGURE 5. Side view of "diaphragm" or sphincter and the two "oral" glands which contain some secretion. The sphincter is slightly relaxed, so is evident a narrow central passage-way that must widen considerably to permit extrusion of tentacles.

FIGURE 6. Frontal view of three calcareous zoecia. The upper two have fully developed and functional orifices and avicularia. The bottom one has a nearly obliterated orifice and avicularium due to secondary calcification. Avicularial chambers are large as compared with those of Figure 3.

FIGURE 7. Retracted polypide. The slender upper third corresponds to Figure 2 but is from a different side. The esophagus is partly hidden by the stomach caecum. The anus is at the uppermost tip of rectum.

FIGURE 8. Diagrammatic side view of zoecia, front wall to the left, side wall facing observer. Ovicelled zoecium complete, the non-ovicelled one only partly shown. The end walls slant, sometimes less obliquely than shown, may even be nearly horizontal in some zoecia. Side walls are perforated by two communication areas. Upper, distal multiporous area (S) is like an internal blister (*cf.* Fig. 19) and is called a rosette plate or pore chamber. Lower, proximal single opening fits against a rosette plate of a neighboring zoecium which is not here shown. Single opening bears the inadequate name of "corresponding opening."

FIGURE 9. Mandible, edge view. The delicate serrated membrane hangs vertically down from front edge. More heavily cuticularized parts are darkened.

FIGURE 10. Diagram of a single, non-ovicelled, wedge-shaped zoecium. Its side wall (with two communication areas) is at left. Its frontal wall (with six frontal pores) is at right. A multiporous end wall is at bottom. Three pores are shown on the avicularial chamber.

FIGURE 11. Colony fragment, drawn to the one-cm. scale at immediate left. Bumps along stalk are ovicells.

FIGURE 12. Frontal view of four zoecia, two with avicularia and two without. From a calcined specimen.

FIGURE 13. Another colony, with more branches. Drawn to same scale as Figure 11.

FIGURE 14. Cross-section of a slightly flattened branch which has thirteen wedge-shaped zoecia at this level.

FIGURE 15. Four eggs in ovary. Nucleoli prominent, excentric. Nuclei clear, vesicular. Cytoplasm homogeneous and denser. Drawn to the 0.06-mm. scale at left.

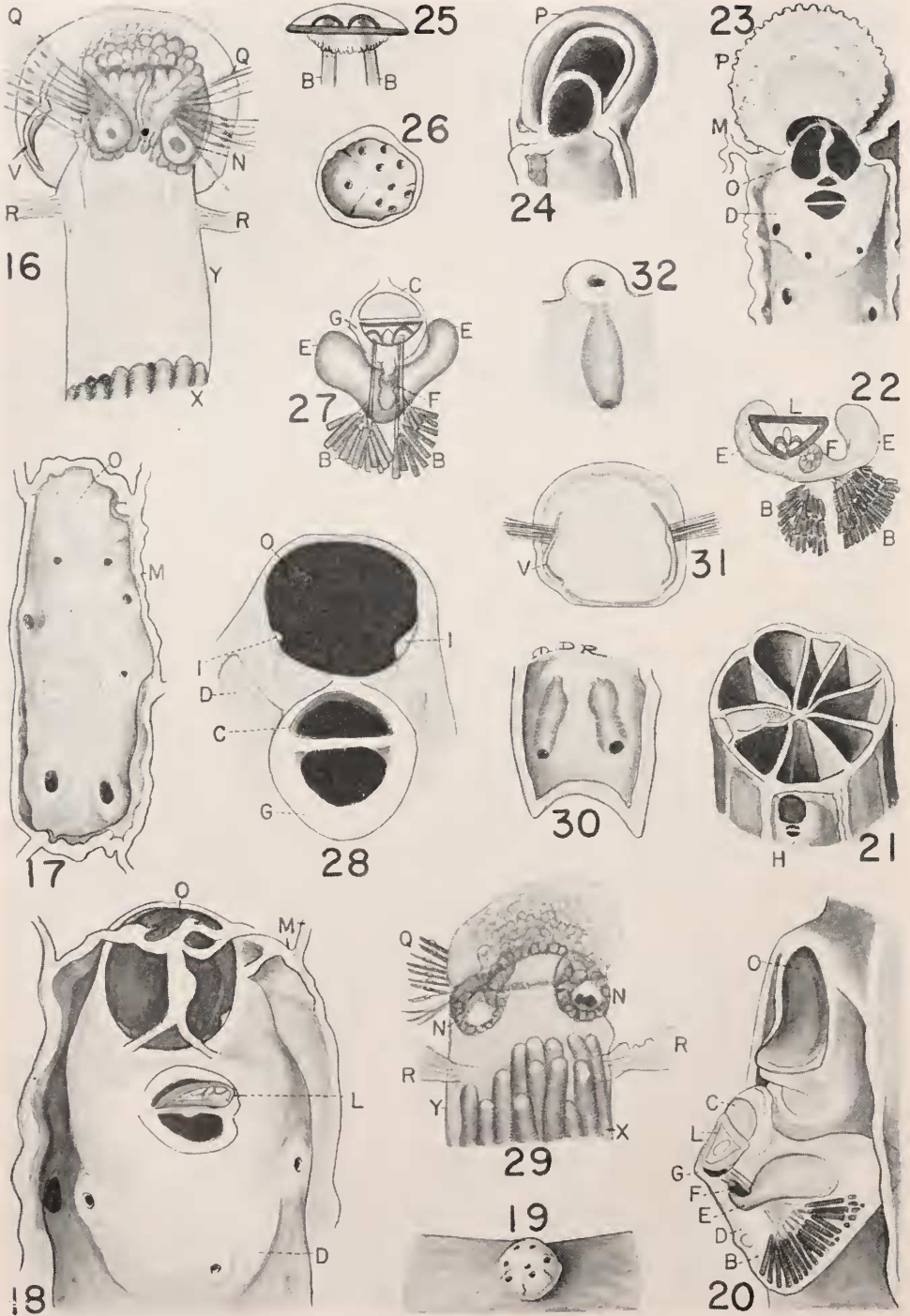


PLATE II

present the ovary is about half-way between the operculum and the avicularial chamber, back of the tentacular sheath. It contains several eggs of different sizes. The ova have a large excentric nucleolus and an almost clear nucleus (Fig. 15). Whether an ovary is present in every zoid cannot be ascertained because of the opacity of zooecial walls. Whether this species is hermaphroditic or dioecious is unknown at present. It was not possible to determine the exact site of origin of spermatogenic tissue although some material, apparently spermatogenic, was found near the stomach in rather sizable patches in the crushed specimens.

*Orifice:* The *H. carsonae* orifice resembles those of the genera *Cryptosula* and *Hippodiplosia*. It is rounded, lepralioid. Part of its distal wall is formed by the next distal zoid. A median tooth, lyrula, is absent. Two slight cardelles or ledges for operculum articulation are placed low at the sides, dividing the orifice into two areas of unequal size. The larger distal area is formed by the anter (distal orifice lip) while the smaller proximal area is bounded by the poster (proximal orifice

## EXPLANATION OF PLATE II

FIGURE 16. Operculum, "diaphragm," "oral" glands, tentacle sheath, tentacle tips and anchoring musculature shown from the back surface. The channel for protrusion of tentacles is more contracted than in Figure 5.

FIGURE 17. Frontal view of zooecium with completely sealed-over orifice in a more advanced stage of calcification than that of Figure 6.

FIGURE 18. Frontal view of the upper half of a zooecium in an early stage of secondary calcification where calcareous trabeculae extend from the mural rims across the orifice. A partly opened mandible articulates with the pivot.

FIGURE 19. Multiporous rosette plate of side wall.

FIGURE 20. Profile of zooecial orifice and avicularium with operculum and mandible, respectively, in place. The avicularial wall is left more transparent than it normally would appear to show the position of the avicularial contents. Compare with Figures 4, 22, 27.

FIGURE 21. Stereogram of typical cylindrical stalk. Orifice and avicularium on bottom zooecium. Porous end wall tops another.

FIGURE 22. Oblique top view of avicularial apparatus. Glands curve around adductor tendons to fit the avicularial chamber.

FIGURE 23. Front of a zooecium which has an ovicell and avicularium, and shows secondary calcification trabeculae spanning the orifice. Ovicell opening is completely plugged up by domed calcareous lamina which occupies about half the ovicell interior and which is here faintly outlined, *cf.* Figure 24.

FIGURE 24. Ovicell whose front wall has been broken away to show the double outer wall and the third (innermost) lamina which has sealed off the ovicell cavity. The lamina resulted from secondary calcification.

FIGURE 25. Edge view of another mandible with serrate membrane and adductor muscle tendons which attach to semicircular areas (*cf.* Fig. 1).

FIGURE 26. Looking through a "corresponding opening" with its irregular annulus or ledge, into the multiporous blister-like rosette plate (*cf.* Fig. 19).

FIGURE 27. Avicularial contents from the under side. Abductors are not shown.

FIGURE 28. Detail of orifice, cardelles and avicularium. The bands leading from orifice to avicularium represent differences in thickness of frontal calcification and are also the distal limits of the avicularial chamber.

FIGURE 29. Frontal view of "oral" glands, operculum and tentacle tips which are very close to extrusion. The "diaphragm" opening is wider than in Figures 5 and 16.

FIGURE 30. Interior of frontal zooecial wall showing shape and direction of tubular frontal pores. The interior openings have been blackened. The exterior openings are faintly rimmed to show their raised nature (*cf.* Figs. 3, 6, 32).

FIGURE 31. Inner face of operculum. Ocluser muscles attach to sclerites.

FIGURE 32. Side view of frontal wall tubular pore and its raised external terminus.



lip). The cardelles form the dividing line between the two areas, *cf.* Figure 28. In side view (Fig. 20), the orifice is not a flat plane. The poster curves outward in lepralioid fashion. There is no difference in size between orifices of the ovicelled and non-ovicelled zoecia.

The zoecial orifice is covered by an operculum shaped to fit (Figs. 20, 31).

It has been the universal and long-time practice for bryozoologists to use the term "chitinous" when describing opercula of those bryozoa which have a more or less horny, yellowish to brown, sometimes unevenly stiffened or reinforced operculum. Its use is based more on the visible physical appearance of the substance (its resemblance to the insect exoskeleton) rather than on its chemical composition. Dr. Libbie Hyman suggests that the term "cuticularized" would be more appropriate since little chemical evidence exists for the presence of chitin in the ectoprocts (bryozoa). So, where I have used the term "chitinized" in the present and in past articles in connection with bryozoa the term "cuticularized" would perhaps have been more suitable.

The *H. carsonae* operculum is lightly cuticularized (Fig. 31). Near its lateral borders, internally, are parenthetical sclerites to which attach delicate oclucosor muscle fibers and from which a flange may develop in some older zoids.

The orifice in many old zoids is overgrown or secondarily calcified and may be entirely sealed over or obliterated (Figs. 17, 18). Sometimes the secondary calcification extends to the avicularium and ovicell, so that the avicularium too fuses over and the ovicell opening is blocked by a dome-shaped calcareous lamina (Figs. 6, 23, 24). Peristome and oral spines are absent.

*Ovicells:* The ovicells were collected long past the breeding season because larvae are absent. The ovicells are either empty or partitioned off by the internal secondary calcification lamina.

Ovicells generally occur in groups at periodic intervals along the stalk. They are not immersed or covered over by the frontal of the next zoid but rest on a cushion formed by it (Figs. 3, 8). They are large, salient, non-porous. Their surface is beaded to tuberculate and faintly ridged. The thin raised rim about the highly arched opening is continuous with the raised mural rims.

*Avicularia:* An avicularium occurs on some zoids, either ovicelled or non-ovicelled. Its size varies from small to medium, some avicularia being twice as large as others. In position it is constant, always sub-oral, median, slanting obliquely forward-downward, away from the orifice.

A pivot bar or hinge (Figs. 18, 28) for articulation with the mandible separates the avicularial surface into two slightly inclined regions: (a) the back area and (b) the mandibular, beak or rostral area. The rostral area is closed by the mandible. The membrane-covered back area is shorter and broader than the rostral area and in this species is always nearest the orifice, the rostral area being the farthest away, both in the mid line and sub-oral (Fig. 20).

In face view the avicularium is broadly oval, wider than long, perched on a wide mound-like avicularial chamber of variable size. Usually three, occasionally more or fewer, small pores perforate the front of this chamber.

There is a great difference in the degree of development or complexity of the soft structures inside the avicularia of various species but in *H. carsonae* they are well developed.

Levinsen (1909) called the avicularia and their contents heterozooecia and heterozoids; Borg (1926) heterozoids; Silén (1938) heterozoids, avicularial polypides, polymorphic individuals. Earlier references exist to the avicularial contents (Waters, 1888, 1892, 1900) but Waters' 1892 account is very adequate and understandably figured, although Silén (1938) published an extensive and excellent study of avicularia of several species.

The avicularial contents of *Hippadenella carsonae* are similar to those described by Waters (1892, pp. 272-274, and Pl. 19, Figs. 1, 2, 4, 5) for *Lepralia foliacea* Ellis and Sollander. In *H. carsonae* the avicularial chamber contains the avicularial polypide, avicularial glands, abductor mandibuli and adductor mandibuli muscles (Figs. 4, 20, 22, 27). The function of the polypide and glands is unknown. Marcus (1939, Pl. 19, Fig. 46) shows the avicularial contents of seven species and on p. 275 says of avicularial glands: "These glands can neither belong to the nervous, nor to the nutritive, or reproductive system and might perhaps have something to do with the stronger skeleton of the Ascophora . . . the function of the(se) organs still remains unknown; they might be poisonous." The *H. carsonae* avicularial glands are sometimes large, hollow and alveolar, with a large lumen and thin wall. Other times they are partly filled with a homogeneous, hardened secretion. The two bilaterally placed glands are united in a saddle-shaped unit that curves about the two bundles of adductor tendons and follows the contours of the very wide avicularial chamber. The avicularial polypide is a small, dense cellular body pinched in the middle so it seems double. It is attached to the back of the avicularial gland isthmus, in the mid-line. A vestibulum connects the polypide to the rostral area below the mandible tip, although this is difficult to see because of the opacity of the calcareous wall, the infrequency of favorably oriented crushed specimens and the small size of the soft structures involved.

The musculature of the avicularium is well developed. The adductor mandibuli muscles are more anterior, proximal and massive than the abductor mandibuli muscles. The adductor muscles have numerous short, thick, faintly striated muscle fibers. Their endings at origin and insertion differ in appearance. Their origin is over an extensive area on the walls and floor of the avicularial chamber. Their insertion is in two small pits, one at each side of the lucida on the inner mandibular surface. The muscle fibers attach bluntly and broadly at the origin while before the insertion is reached the muscle fibers have given way abruptly to delicate membranous and fine tendinous tissue (Figs. 4, 20). The tendon fibers attach by bead-like enlargements to the insertion site (Figs. 1, 25, 27).

The abductors form a very diffuse, sparsely fibered curtain against the distal end of the avicularial chamber. Their fibers originate on the back avicularial chamber wall and insert on the cuticularized membrane very close to the pivotal bar against which the mandible articulates. They do not seem to be striated and are considerably more slender than the adductor fibers. Marcus (1939, p. 273) states that in species studied by him the avicularial adductors are striated but the abductors smooth. This is true of *H. carsonae* also.

The avicularium is topped by a cuticularized mandible and a back area membrane (Figs. 20, 27). The mandible has a narrowly elliptical lucida flanked on each side by a somewhat semicircular pit into which the adductor tendons attach. A broad cuticularized band reinforces the mandible edges and base (Figs. 1, 22). A

short, delicate, transparent and serrated membrane decorates its front border (Figs. 9, 25), hanging down vertically, so it is almost invisible from the top (Fig. 1).

*Distribution and ecology:* *Hippadenella carsonae* turned up in only two dredgings of Jan. 29, 1948, Comdr. D. C. Nutt collector; one fragment from Sta. 101, and a pintful of twigs from Sta. 104. Both stations were from the Ross Sea area, Antarctica, off Cape Royds, Ross Island, from 58 fathoms. Most of the twigs were empty of polypides and relatively clean of extensive extraneous growths or encrustations. When other forms did grow on or in them these were relatively few in number and sparsely distributed over the branches, so apparently the twigs of *H. carsonae* did not present as hospitable a stratum for settling of other forms as does *Phylactellipora lyrulata* or some other species. The following organisms or their products are attached to the dead parts of *H. carsonae* twigs from Sta. 104: brown and green Folliculinids, Foraminifera, brown and white sponges, yellow egg cases (of flatworms?), calcareous tubes of annelids and scraps of various bryozoa. The bryozoa growing in small patches or attached to *H. carsonae* are several species of the Order Cyclostomata and the following of the Order Cheilostomata: *Cellaria moniliorata*, *Hippothoa bougainvillei*, *Hippothoa distans*, *Phylactellipora lyrulata* and a number of other species awaiting fuller identification. The Cyclostomata are especially numerous and seem to favor this species. Some Sta. 104 *H. carsonae* twigs grow on or partly engulf alcyonarian and sponge spicules, Cyclostomata, *Cellaria moniliorata*, *Cellaria vitrimuralis*, *Smittina ordinata* and other cheilostomes yet to be identified. In a discussion of *Smittina ordinata* (Rogick, 1956, p. 300) reference was made to *Smittina ordinata* growing on "other Bryozoa at Sta. 104," the other bryozoa in this case being *H. carsonae*.

*Hippadenella carsonae* specimens are deposited in the Smithsonian Institution, U. S. National Museum, USNM Cat. Nos. 11357 through 11364.

#### SUMMARY

1. The morphology of *Hippadenella carsonae*, new ectoproct from the Antarctic, is described in detail and measurements made of many of its structures.
2. At the time of its collection, Jan. 29, ovicells were empty of embryos but developing eggs were in the ovaries. Developing embryos were absent from the body cavity also.
3. Living polypides occurred at the tips of some twigs but most of the material was dead or empty of polypides, at the time of collection.
4. The species has an unusually well developed avicularial apparatus consisting of large glands, reduced polypide, abductor and adductor muscles.
5. So-called "oral" or "sub-oral" glands are present. They are near the operculum but have no actual connection with, or proximity to, the true polypide mouth.
6. The function of "oral" glands, avicularial glands and avicularial polypide is unknown in this species, and a matter for speculation in other species.
7. Other peculiarities of this species are the oblique tubular frontal wall channels (frontal pores) and the mode of secondary calcification where trabeculae span the orifice and a domed lamina seals the ovicell.

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